Volume 5, No. 6 June, 2024
p ISSN 2723-6927-e ISSN 2723-4339

Delayed Hemothorax Due to Thoracic Trauma with Multiple Rib Fracture: A Case Report

Amaro Yudho Wibowo[1], Sofian Palupi[2], Raden Sri Triyono[3]
Muhammadiyah Mardhatillah Hospital, Pemalang, Indonesia
Email: amaroyudho@gmail.com, sofianpalupi23@gmail.com, sritriyono2@gmail.com

ABSTRACT
Recent evidence indicates that elderly who have suffered rib fractures may develop delayed massive hemothorax. Delayed enormous hemothorax after thoracic trauma is uncommon, but it is nevertheless linked to high rates of mortality. This single case report provides an overview of the ordinary and important delayed hemothorax caused by thoracic trauma with multiple rib fractures in limited healthcare facilities. We observe symptoms and chest X-rays before and after the development of delayed hemothorax. A 56-year-old man came to the hospital with complaints of shortness of breath and pain in the chest and right shoulder. The patient said that four days ago, He fell from a height of around 6 meters. After visiting the hospital four days prior, the patient was diagnosed with multiple fractures of the inferior aspect of the right ribs (costa 3-7) as well as a fracture of the right clavicle. However, the patient declined surgery and was made to return home. At that time, the patient did not experience shortness of breath. Currently, the patient is experiencing dyspnea. Blood pressure 138/91 mmHg, heart rate 89 beats per minute, respiration rate 26 times per minute, Spo2 91% room air. The chest x-ray currently shows a right hemothorax. After stabilization, the patient asked to be referred to another hospital for further treatment. Patients with multiple fractured ribs, especially with rib displacement, are at high risk of evolving delayed hemothorax. Close monitoring and observation for several days are necessary.

Keywords: case report, delayed hemothorax, thoracic trauma

INTRODUCTION

Thoracic trauma, including fractures of the ribs, hemothorax, pneumothorax, and pulmonary contusions, is a common injury among the elderly (Buyukkaya & Buyukkaya, 2024; Gioffrè-Florio et al., 2018). 94% of patients who have a rib fracture also have secondary injuries, and about 50% of them need to be admitted to the intensive care unit or undergo surgery (Ozel et al., 2024; Talbot et al., 2017). Recent evidence indicates that older adults who have suffered rib fractures may develop massive hemothorax that progresses in a delay over several days (Ouwerkerk et al., 2023; B. Wang & Peng, 2024). Delayed enormous hemothorax after blunt thoracic trauma is uncommon, but it is nevertheless linked to high rates of morbidity and mortality (Asim et al., 2023; Gilaed et al., 2024; Lin et al., 2024).

The literature on traumatic rib fractures with readmissions brought on by delayed hemothorax is currently limited. This is probably because delayed hemothorax readmissions sometimes happen over several admissions, making it challenging to identify delayed hemothorax patients. This single case report provides an overview of the common and important delayed hemothorax due to thoracic trauma with multiple rib fractures in limited

healthcare facilities. We analyzed the patient's symptoms and chest X-ray results before and after the development of the delayed hemothorax.

CASE PRESENTATION AND RESULT

A 56-year-old man came to the hospital with complaints of shortness of breath and pain in the chest and right shoulder. The patient said that four days ago, he fell from the second floor of the house at a height of around 6 meters, with his right shoulder and chest hitting the ground first. After visiting the hospital four days prior, the patient was diagnosed with multiple fractures of the inferior aspect of the right ribs (costa 3, 4, 5, 6, and 7) as well as a fracture of the right clavicle and right scapula. However, the patient declined surgery and was made to return home to choose using traditional medicine. No right hemothorax was detected (Figure A). At that time, the patient did not experience shortness of breath, but the patient began to feel short of breath on day two after hospital discharge. Currently, the patient is experiencing dyspnea. Blood pressure 138/91 mmHg, heart rate 89 beats per minute, respiration rate 26 times per minute, Spo2 91% room air. Physical examination shows dullness percussion and tenderness in the right side of the chest. The chest x-ray currently shows a right hemothorax (Figure B). The patient experienced a delayed hemothorax. After stabilization, the patient asked to be referred to another hospital for further treatment because of personal reasons.

a

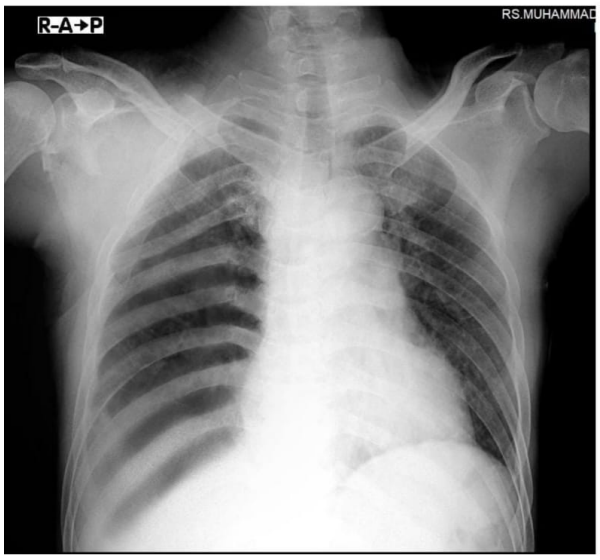

Figure 1.
chest x-ray on first admission showed no evidence of hemothorax

b

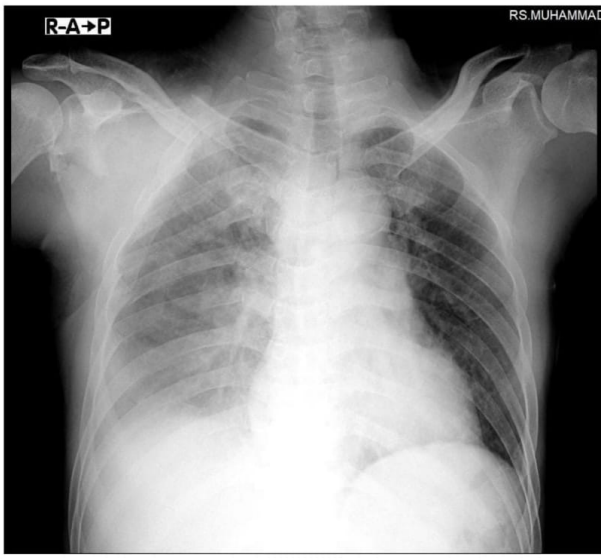

Figure 2.
chest x-ray on last admission showed right hemothorax

DISCUSSION

Delayed hemothorax was discovered and confirmed after additional clinical tests but was not evidenced at the time of the initial assessment. There may be as little as two hours between the initial and follow-up studies (Fermin & Henderson, 2022; Muronoi et al., 2020). Our patient showed no evidence of hemothorax at the first admission to our hospital. As his

hemothorax developed two days later, he was diagnosed with delayed right hemothorax. According to earlier research, the incidence of delayed hemothorax following blunt chest trauma ranges from 2.1% to 33% (Yap et al., 2018).

It has been found that 92% of delayed hemothorax cases had several rib fractures or a single displaced fracture. Aside from the chest wall, several intra-thoracic organs might cause bleeding. In addition to intercostal artery injury, injuries to the diaphragm, lung, and thoracic aorta have been recorded to induce hemothorax (Hanabusa et al., 2022; Okamatsu et al., 2022). Our patient had several fractures on the inferior aspect of the right ribs (costa 3, 4, 5, 6, and 7). The 6th–10th ribs are likewise the largest, with longer intercostal arteries and more bone mass to disturb underlying vessels (Löffler et al., 2024; S. Wang et al., 2021; Xiao et al., 2024).

One-third of thoracic trauma deaths occur within minutes of the incident, one-third occur within hours in the hospital due to vascular injury and respiratory distress caused by widespread parenchymal damage, and the remaining one-third occur because of complications that develop and occur in days (Rendeki & Molnár, 2019). Delayed hemothorax readmission risk factors include pleural injury and anticoagulation/coagulopathy.

Pleural injury can result from pleural drainage, numerous rib fractures, pneumothorax, or hemothorax (Elbers et al., 2018). Thoracic trauma management principles include primary survey, vital function resuscitation, comprehensive secondary survey, and definitive treatment. Hypoxia is a significant issue in thoracic trauma, and early intervention is required (Herrod et al., 2019). Mitigating delayed hemothorax requires a larger study to understand prevalence better and validate proposed risk factors. A case-control study to further evaluate potential risk factors for delayed hemothorax may be helpful but would likely suffer from verification bias. A prospective cohort study is needed to assess injury patterns and mechanisms that portend increased delayed hemothorax risk. In clinical practice, predicting a delayed hemothorax is difficult. Therefore, it is important to carefully observe trauma patients with lower rib fractures due to delayed hemothorax. High-risk patients may require focused follow-up imaging to prevent readmissions, even without clinical symptoms.

CONCLUSION

Patients with multiple fractured ribs, especially with rib displacement, are at high risk of evolving delayed hemothorax. Therefore, we should be very careful about this possibility. Close monitoring and observation for several days are necessary. The conclusion emphasizes the critical need for vigilant monitoring of patients with multiple fractured ribs, particularly those with displaced ribs, due to their heightened susceptibility to developing delayed hemothorax. Early recognition and appropriate management of this complication can significantly improve patient outcomes and reduce the likelihood of readmissions or other serious complications. Vigilance in monitoring these patients, even in the absence of immediate symptoms, is paramount for ensuring timely intervention and preventing potential life-threatening consequences.

REFERENCES

Asim, M., El-Menyar, A., Chughtai, T., Al-Hassani, A., Abdelrahman, H., Rizoli, S., & Al-Thani, H. (2023). Shock Index for the Prediction of Interventions and Mortality in Patients With Blunt Thoracic Trauma. *Journal of Surgical Research*, *283*, 438–448. https://doi.org/10.1016/j.jss.2022.10.067

Buyukkaya, A., & Buyukkaya, R. (2024). Delayed Presentation of Traumatic Diaphragmatic Rupture With Hemothorax. *Archivos de Bronconeumologia*, *60*(5), 304–305. https://doi.org/10.1016/j.arbres.2024.02.006

Elbers, L. P. B., Fliers, E., & Cannegieter, S. C. (2018). The influence of thyroid function on the coagulation system and its clinical consequences. In *Journal of Thrombosis and Haemostasis* (Vol. 16, Issue 4). https://doi.org/10.1111/jth.13970

Fermin, P., & Henderson, L. (2022). Delayed traumatic hemothorax. *Visual Journal of Emergency Medicine*, *29*. https://doi.org/10.1016/j.visj.2022.101544

Gilaed, A., Shorbaji, N., Katzir, O., Ankol, S., Badarni, K., Andrawus, E., Roimi, M., Katz, A., Bar-Lavie, Y., Raz, A., & Epstein, D. (2024). Early risk factors for prolonged mechanical ventilation in patients with severe blunt thoracic trauma: A retrospective cohort study. *Injury*, *55*(1). https://doi.org/10.1016/j.injury.2023.111194

Gioffrè-Florio, M., Murabito, L. M., Visalli, C., Pergolizzi, F. P., & Famà, F. (2018). Trauma in elderly patients: A study of prevalence, comorbidities, and gender differences. *Giornale Di Chirurgia*, *39*(1). https://doi.org/10.11138/gchir/2018.39.1.035

Hanabusa, Y., Kubo, T., Watadani, T., Nagano, M., Nakajima, J., & Abe, O. (2022). Successful transcatheter arterial embolization for a massive hemothorax caused by acupuncture. *Radiology Case Reports*, *17*(9), 3107–3110. https://doi.org/10.1016/j.radcr.2022.05.040

Herrod, P. J., Boyd-Carson, H., Doleman, B., Blackwell, J., Williams, J. P., Bhalla, A., Nelson, R. L., Tou, S., & Lund, J. N. (2019). Prophylactic antibiotics for penetrating abdominal trauma: duration of use and antibiotic choice. In *Cochrane Database of Systematic Reviews* (Vol. 2019, Issue 12). https://doi.org/10.1002/14651858.CD010808.pub2

Lin, C.-H., Lu, C.-W., Lin, Y.-C., Ma, C.-Y., Kang, S.-C., Liao, C.-H., & Fu, C.-Y. (2024). Evaluation of the Cushion Effect in Blunt Abdominal Trauma Patients: A Computerized Analysis. *Injury*, 111677. https://doi.org/10.1016/J.INJURY.2024.111677

Löffler, M. T., Wu, P. hung, Pirmoazen, A. M., Joseph, G. B., Stewart, J. M., Saeed, I., Liu, J., Schafer, A. L., Schwartz, A. V., Link, T. M., & Kazakia, G. J. (2024). Microvascular disease not type 2 diabetes is associated with increased cortical porosity: A study of cortical bone microstructure and intracortical vessel characteristics. *Bone Reports*, *20*. https://doi.org/10.1016/j.bonr.2024.101745

Muronoi, T., Kidani, A., Oka, K., Konishi, M., Kuramoto, S., Shimojo, Y., Hira, E., & Watanabe, H. (2020). Delayed massive hemothorax due to diaphragm injury with rib fracture: A case report. *International Journal of Surgery Case Reports*, *77*, 133–137. https://doi.org/10.1016/j.ijscr.2020.10.125

Okamatsu, Y., Tsubouchi, K., Iwasaki, T., Nakamura, T., Nakashima, T., Nakatsuru, K., Takahata, Y., & Harada, T. (2022). Recurrent Massive Hemothorax of Unknown Etiology in an 85-Year-Old Man. *Chest*, *161*(2), e103–e110. https://doi.org/10.1016/j.chest.2021.09.012

Ouwerkerk, J. J. J., Argandykov, D., Gerban, A., Proaño-Zamudio, J. A., Dorken-Gallastegi, A., Hwabejire, J. O., Kaafarani, H. M. A., Velmahos, G. C., & Parks, J. (2023). Delayed hemothorax readmissions after rib fracture in blunt trauma patients. *Journal of Clinical Orthopaedics and Trauma*, *45*. https://doi.org/10.1016/j.jcot.2023.102259

Ozel, M., Tatliparmak, A. C., Cetinkaya, R., Sizlanan, A., Ak, R., & Yilmaz, S. (2024). Earthquake-related isolated blunt thoracic trauma patients: A special population study in the emergency department. *American Journal of Emergency Medicine*, *75*, 148–153. https://doi.org/10.1016/j.ajem.2023.10.050

Rendeki, S., & Molnár, T. F. (2019). Pulmonary contusion. In *Journal of Thoracic Disease* (Vol. 11). https://doi.org/10.21037/jtd.2018.11.53

Talbot, B. S., Gange, C. P., Chaturvedi, A., Klionsky, N., Hobbs, S. K., & Chaturvedi, A. (2017). Traumatic rib injury: Patterns, imaging pitfalls, complications, and treatment. *Radiographics*, *37*(2). https://doi.org/10.1148/rg.2017160100

Wang, B., & Peng, Z. (2024). The risk factors for delayed hemothorax in patients with rib fracture in the emergency department. *American Journal of Emergency Medicine*. https://doi.org/10.1016/j.ajem.2024.04.014

Wang, S., Yang, X., Ding, D., Wu, X., Han, Z., Sun, L. W., & Fan, Y. B. (2021). The changes of bone vessels and their role in bone loss in tail-suspended rats. *Acta Astronautica*, *189*, 368–378. https://doi.org/10.1016/j.actaastro.2021.08.031

Xiao, C. L., Liu, L. L., Tang, W., Liu, W. Y., Wu, L. Y., & Zhao, K. (2024). Reduction of the trans-cortical vessel was associated with bone loss, another underlying mechanism of osteoporosis. *Microvascular Research*, *152*. https://doi.org/10.1016/j.mvr.2023.104650

Yap, D., Ng, M., Chaudhury, M., & Mbakada, N. (2018). Longest delayed hemothorax reported after blunt chest injury. *American Journal of Emergency Medicine*, *36*(1). https://doi.org/10.1016/j.ajem.2017.10.025